

The Ohio Naturalist,

PUBLISHED BY

The Biological Club of the Ohio State University.

Volume VII.

DECEMBER, 1906.

No. 2.

TABLE OF CONTENTS.

HINE—The North American Species of <i>Tabanus</i> with a Uniform Middorsal Stripe.....	19
HINE—Two Species of Diptera Belonging to Asilinae.....	29
SCHAFFNER—A Successful Mutant of <i>Verbena</i> Without External Isolation.....	31
DURRANT—Descriptions of New Mallophaga, II.....	35
OSBORN—Note on Habits of <i>Senotainia rubriventris</i> Macq.....	38
SCHAFFNER—Nodding of the Terminal Heads of <i>Silphium laciniatum</i>	39
METCALF—Meeting of the Biological Club.....	40

THE NORTH AMERICAN SPECIES OF *TABANUS* WITH A UNIFORM MIDDORSAL STRIPE.

JAMES S. HINE.

There are a number of species of the genus *Tabanus* in the Americas characterized by having a regular gray or yellow middorsal stripe continued for the length of the abdomen. Most of them have the anterior leg black with the exception of the base of the tibia which is gray or yellowish; but there are a few variations which will be mentioned later. Such species resemble more or less the very abundant and troublesome *costalis* and *lineola*, which are commonly called green-head flies, and which are important stock pests, having been associated in recent years with the transmission of certain infectious diseases of domesticated animals.

There are a score or more of species of this type in North America and several more in South America, but they do not appear to be so numerous in the Eastern Hemisphere. Green-head flies is a common English name for all. Some have a wide range, being reported from northern North America to Brazil and from the Atlantic almost to the Pacific, while others, so far as known, are restricted to much more limited areas.

Wherever I have observed they are the most abundant of their family in season, and are exceptionally persistent in their attacks. They are never particularly conspicuous, nor do they make much noise when flying around an animal, but appear to come from all directions and at once alight on the limbs or under parts, and begin biting before their selected victim is scarcely aware of their presence.

Wooded areas appear to have particular attractions for them. In southern United States and Central America a

densely wooded tract on rather low and level ground is often referred to as a swamp. Here these flies abound, and at times are so abundant that it is impossible to drive some horses into their domains. Other animals when compelled to withstand their attacks are difficult to control, for the bites are numerous and severe. It is hardly possible to describe their abundance properly, they must be seen to be appreciated fully.

Although the different species are much alike in general appearance, they are quite easily separated when both sexes of all of them are at hand. Some have the eyes hairy, a character which is most conspicuous in the male; in the eyes of some of the males the facets are all nearly of the same size, in others there is a very small area of large facets on the disc of each eye, while in others the area of large facets is so extended that two-thirds of the extent of the eyes is included. Some of the species have the eyes pilose and here the difference in the extent of the area of large facets is as pronounced as in the other case. Where there are no large facets the head is smaller than in the cases where these are of large extent. Some species have a short stump of a vein near the base of the branch of the third longitudinal, and good specific characters exist in the coloration of the posterior femora. The last two characters seem rather trivial when used in reference to the members of the family in general, but I have found that in this group, when used in connection with the structure of the eyes of the male, they are very constant and consequently may be used with good results in separating the females. The banding of the eyes and the coloration of the thorax and abdomen are specific characters in some cases; also the relative size of the first antennal segment of the various species is of value, but as this last can be expressed only as a comparison with some other species its value in keys and descriptions is very limited.

In some of the species the males have the habit of hovering in the sunshine as the Syrphid flies do. This habit was only observed by myself in two species, both belonging to the section with uniform sized facets. The first observation was made in reference to the species I have identified as *Tabanus truquii*, near Sanarate, Guatemala. While riding on horseback along the main road I saw the fly hovering about six or eight feet above the ground in bright sunshine. The specimen was accommodating enough to remain in the same place until I dismounted, got my net together and captured it. The other species I observed along the railroad near Puerto Barrios. I had been walking where the track was more or less shaded, but rather suddenly coming out into an open place where the sun's rays were not obstructed, I could see dozens of *Tabanids* hovering just above my head and succeeded in capturing a number of

them. These males with numbers of females from the same locality are types of a species described below under the name *Tabanus stenocephalus* in reference to its very small head when compared with some other species that are much like it in general appearance.

The males of many, perhaps of all the species of *Tabanus* spend much time flying in the sunshine, but the habit of hovering appears to be confined to a few, may be to those with the small head and uniform sized facets. Those that do not hover fly so rapidly that the eye cannot follow them, but one is apprised of their presence by recognizing the sound of their wings. Now and then they alight for an instant on some weed or bush, or sometimes on the ground, after which they continue as before.

By including all the species with a uniform middorsal gray band, a few are brought in that are more or less aberrant to the group, consequently at least three treated in the present paper do not appear to be closely associated with the others.

No doubt students will find it difficult to separate out the species falling here, especially if they happen to possess only one or two out of the fifteen or more known.

The following key is offered as an aid, and in every instance does not make use of characters which are considered the most specific, but such as are most likely to be found with the usual limited number of specimens at hand:

1. Posterior femur uniformly reddish for its entire length. 2.
- Posterior femur black or at least blackish on basal part. 8.
2. Wings wide, a distinct brown spot on the furcation of the third vein. *acutus* Bigot
- Wings normal, no brown spot on the furcation of the third vein. 3.
3. A row of rounded gray spots on either side of the middorsal abdominal stripe. 4.
- Three gray or yellow stripes on the dorsum of the abdomen, lateral stripes abbreviated. 5.
4. Costal cell fuscous, a single green band on the eye in life.
- fuscicostatus* n. sp.
- Costal cell dilute yellow, two green bands on the eye in life. *sagax* O.S.
5. Eyes pilose, very plainly so in the male. *guatemalanus* n. sp.
- Eyes not pilose. 6.
6. Abdomen reddish, branch of the third vein without an appendage. *carneus* Bellardi
- Abdomen fuscous, branch of the third vein with an appendage. 7.
7. Thorax yellowish. *trilineatus* Latr.
- Thorax fuscous. *appendiculatus* n. sp.
8. Abdomen with a gray middorsal stripe and rounded lateral spots, costal cell fuscous. *fuscicostatus* n. sp.
- Lateral markings of the abdomen not in the form of rounded spots. 9.
9. Abdomen with a middorsal stripe and oblique lateral spots which are angular and contiguous. *lineola* Fabr.
- Lateral markings of the abdomen linear. 10.
10. Thorax dark or nearly black. 11.
- Thorax gray or yellowish. 15.

11. Middorsal stripe clear yellow, wings with some of the longitudinal veins margined with pale brownish. *stenocephalus* n. sp.
- Middorsal stripe gray, wings uniform dilute brownish or hyaline. 12.
12. Wings clear hyaline, eyes pilose. *truquii* Bellardi
- Wings dilute brownish, eyes not pilose. 13.
13. Abdomen dark brown, front of the female unusually narrow. *trivittatus* Fabr.
- Abdomen black, front of the female of normal width. 14.
14. Small species, no lateral stripes on the abdomen. *unistriatus* n. sp.
- Medium sized species, short lateral stripes on the abdomen. *modestus* Wied.
15. Front and thorax gray. 16.
- Front and thorax yellow. 17.
16. Length 9 to 11 millimeters, head of the male very small. *nigrovittatus* Macquart
- Length 12 to 14 millimeters, head of the male large. *conterminus* Walker
17. Eyes with a single green band in life, costal cell distinctly colored. *costalis* Wied.
- Eyes with two green bands in life, costal cell nearly hyaline. *quinquevittatus* Wied.

Tabanus acutus Bigot. General color, light brown; first two segments of the antenna and the base of the third light brown, apex of the third darker; wings wide, light brown and with a small dark spot at the furcation of the third vein; legs concolorous with the body, apex of each anterior tibia and all the tarsi darker; abdomen light brown, a little darker toward the apex, with a middorsal, wide, gray stripe extending for the whole length.

Female: Length 15-19 mm., head rather small, face and front clothed with yellowish pollen, front of normal width, sides parallel, frontal callosity large, shining chestnut in color, inferiorly not quite as wide as the front, narrowed slightly above and with a connected line extending more than half way to the vertex, abdomen elongate, conical, gradually narrowed toward the apex.

Male: Length 14-16 mm., head rather small, hemispherical; abdomen quite noticeably narrowed to two thirds of its length, sides nearly parallel from thence to apex.

Habitat: Several males and females taken along the Mississippi River below New Orleans, also one female from Cameron near the Gulf Biologic Station.

It seems certain that the identification is correct in this case, for the species is such a striking one that a short description is sufficient to fully characterize it. Bigot placed it in the sub-genus *Atylotus* but it does not belong there.

Tabanus appendiculatus n. sp. General color fuscous; first segment of the antenna large, clothed with short black hairs above, entire antenna reddish with the exception of the annulate portion of the third segment which is darker, wing hyaline with a

rather conspicuous brown stigma and brownish margins to some of the longitudinal veins near the apex; fork of the third vein with a short appendage; posterior femora wholly red; abdomen fuscous with three stripes yellowish-white in color, the lateral ones not usually reaching beyond the third segment.

Female: Length 10–14 mm., head wider than the thorax; front slightly narrowed below, clothed with yellow pollen, callosity shining nearly black, slightly narrower than the front, nearly square with a very narrow, sometimes unconnected, line above; face clothed with white pubescence; thorax dark, in well preserved specimens with more or less greenish reflecting pollen and scattering, short, black hairs.

Male: Length 14 mm., head decidedly broader than the thorax with a large area of very large facets; face and breast clothed with white pubescence; disc of the thorax with rather dense erect, nearly black hairs which are much longer than in the other sex.

The types of the species were taken at Puerto Barrios, Guatemala, March 4, 1906, numerous other specimens from Gualan and Panzos in Guatemala, Belize in British Honduras and Puerto Cortez in Spanish Honduras.

Tabanus carneus Bellardi. General color reddish; antenna red with the annulate portion of the third segment slightly darker; wing hyaline, stigma brown, fork of the third vein without an appendage; posterior femur entirely red; abdomen red, a little darkened at the extreme apex, three yellowish-white dorsal stripes, the middle one plainly marked for the whole length, but the lateral ones almost obsolete.

Female: Length 11–13 mm., thorax above reddish, sparsely clothed with gray pollen and short dark hairs.

Male: Length 13 mm., head wider than the thorax, with a distinct area of enlarged facets on each eye; thorax above reddish, rather densely clothed with erect brown pile and a small amount of gray pollen.

Habitat: Specimens are at hand from Frontera, Mexico and from Puerto Barrios, Guatemala.

Tabanus conterminus Walker. Before describing this species it is well, perhaps, to offer an explanation for using this name. When the males of the species of the Atlantic coast are brought together it is certain that there are two species in what has gone under the name of *T. nigrovittatus* ever since Osten Sacken published his Prodrôme of a Monograph of the Tabanidae of the Eastern United States. Having the males separated I studied to locate their females and believe I have succeeded. Walker's description appears to fit the species very well for color and exactly for size, so the name is adopted until it can be proven just what the proper solution of the matter is.

The species is colored much like *nigrovittatus* as given below. However, the thorax is a steel gray while in the last named species this part is gray but very slightly tinted with yellowish. Specimens are rather narrow and elongate and the length appears to be of specific value, at least such is the case with the specimens at hand. The males of the two species are very different: in *conterminus* the head is very large, as in *costalis*, and the area of enlarged facets extends back to the occiput above, while in *nigrovittatus* the head is small with the area of enlarged facets confined to the disc, a band of small facets occupying the upper part of the head forward as far as one-fourth the length of the line of union of the eyes. Length of both sexes 12-14 mm.

Habitat: Specimens are at hand from Beaufort, N. C., collected by Sherman; Avalon and Cape May, N. J., and Fernandina, Florida.

***Tabanus costalis* Wiedemann.** This species is well known over a large part of North America. The thorax is decidedly yellow, the wings are hyaline with the costal cell yellowish-brown and the abdomen varies some in coloration, but the mid-dorsal band is always present, regular and yellow in color; in living specimens the eyes are crossed by a single green band. Length, 11-15 mm.

***Tabanus fuscicostatus* n. sp.** General color fuscous; front of normal width, yellowish-gray in color, sides nearly parallel, frontal callosity brown nearly square and with a line, usually unconnected above, antenna rather long, basal segment slender, third segment with a well defined basal process above and with the annulate portion black or at least dark, palpi white, proboscis black; face, sides and ventral part of the thorax clothed with white pollen and pile; disc of the thorax gray, unstriped; legs reddish in general coloration, all the femora often cinereous on basal part, apical part of each anterior tibia and all the tarsi brownish; wing hyaline with the costal cell dark, fuscous in most specimens; abdomen with a distinct middorsal stripe which has a tendency to increase slightly in width at the posterior border of each segment, and a row of spots on each side. Length of the female 10-15 mm.

Type locality Baton Rouge, Louisiana, but specimens are at hand from various parts of that state. From dry specimens the species can easily be placed under *sagax* for the color of legs and abdomen are right for that, but when the living specimens are studied it is found that the eye is crossed by only a single green band which, with the colored costal cell, would denote relationship with *costalis*. The male was not procured.

***Tabanus guatemalanus* n. sp.** Head very large, eyes pilose; general color dark brown, some specimens approaching reddish; antenna red with the annulated portion of the third segment

black, first segment a little larger than the same in *costalis*, third segment not especially wide, a well defined basal prominence, annulate portion about the same length as the basal; legs mostly reddish; anterior femur on the upper side, anterior tibia at apex and all the tarsi dark; wing hyaline with a small brown stigma; abdomen brown, in some specimens notably darker than in others, with three yellow, middorsal stripe reaching the apex, the lateral ones abbreviated behind.

Female: Length 12-15 mm., front rather wide, slightly narrowed below, clothed with yellowish-brown pollen and a few hairs; callosity pale brown, nearly square with a very slender connected line above; thorax above rather dark, clothed with gray pollen and dark hair, face and sides of thorax with white hair.

Male: Length 12-15 mm., head with an extensive area of large facets, small facets behind the large ones compose a band entirely behind the point where the eyes unite at vertex; thorax a little lighter than in the female and clothed with longer hair.

The eyes in this species are plainly pilose in the female as well as in the male and by this it may be known from others. The very pale frontal callosity in the female is also distinctive. Many specimens taken at San Jose, Guatemala, February 5, 1905. They were taken by beating a large grass that grew only a few yards back from the beech.

Tabanus lineola Fabricius. This common species is known from all the others mentioned in this paper by the oblique, angular and connected row of spots on each side of the abdomen. It is the only one of these species that has any suggestion of stripes on the thorax. Length about 14 mm.

Tabanus modestus Wiedemann. Length 13-15 mm., general color black; antenna red, first segment enlarged with black hairs above, third segment with a prominent basal process, annulate portion darker in color than the basal; front of normal width, slightly narrowed below, clothed with yellow pollen, callosity shining black narrower than the front and with a connected line above; thorax above grayish-black; wing uniformly dilute brownish with a darker stigma; legs black except the base of each anterior tibia which is white, and all the other tibiae which are reddish except extreme apices; abdomen with a middorsal narrow white stripe, and a more or less obscured stripe of the same color on each side only reaching the third segment.

Specimens are at hand from San Carlos, Costa Rica. The size in conjunction with the color of wings and body serve to distinguish this from other species here mentioned.

Tabanus nigrovittatus Macquart. General color similar to *costalis*; antenna reddish, first segment slender; third segment with an angle above, annulate portion black, slightly longer

than the basal; thorax gray above with a faint yellowish tinge; abdomen black in ground color, except each side of the first three segments which is red, a gray middorsal stripe and on the last three or four segments indications of gray lateral stripes; wings hyaline with the costal cell dilute yellowish; extreme apices of all the femora, basal part of anterior tibia and all except the extreme apices of the other tibiae yellow, otherwise legs dark brown or black.

Female: Length 9-11 mm., front clothed with gray pollen, sides parallel, callosity nearly square, shining and with a line above.

Male: Length 11 mm., head small with only a few large facets on the disc of each eye. For further statements regarding the male of this species see under *conterminus* above.

Habitat: I procured a number of this species at Bay Ridge, Maryland, by sweeping in grassy areas near water. Others from Durham, N. H.; Suffield, Ct.; Woods Hole, Mass.; and Anglesia, New Jersey.

Tabanus quinquevittatus Wiedemann. General color much as in *costalis*. Head large; first segment of the antenna somewhat enlarged and furnished with short black hairs above, third segment rather wide, basal portion red and with a well defined angle above, annulate portion about as long as the basal; thorax yellowish-gray; wing hyaline with a small yellow stigma; front legs black with the exception of the basal parts of the tibiae which are yellow, apices of femora of the other legs, tibiae and metatarsi of the middle legs, and tibiae except apices, and the metatarsi of the posterior legs yellow, other parts brown.

Female. Length 13-16 mm., front of normal width, slightly narrowed below, callosity shining black and nearly square; abdomen above with the margin on each side and three stripes yellow, intervals between the yellow dark brown or black.

Male: Length as in the other sex, head very large, area of enlarged facets extensive, a narrow band of small facets next the occiput above; abdomen somewhat variable: the middorsal stripe well marked and margined with fuscous on either side, remainder usually pale yellowish without well defined markings.

Habitat: Gulf coast of Louisiana, and Galveston, Texas. Bellardi has it from Mexico.

Tabanus sagax Osten Sacken. This appears to be the least common of the species here treated. The legs are red throughout with the feet slightly darker than the other parts; the thorax is dark, thinly clothed with grayish pollen; abdomen with a distinct middorsal gray stripe and a row of spots on each side, a pair to each segment; wings hyaline, costal cell dilute yellowish. Length 13-16 mm. Known from Illinois, Minnesota and New Jersey.

Tabanus stenocephalus n. sp. General color dark brown, nearly black; head rather small, antenna red with the annulate portion of the third segment black, first segment enlarged and clothed with black hairs above, third segment with a well defined angle above at base, annulate portion shorter than the basal; thorax dark brown above, wings faintly clouded, stigma prominent, brown, longitudinal veins near the apex faintly margined with brown, branch of the third vein without an appendage; anterior leg black except the basal part of the tibia which is white, other legs with basal half of each femur, extreme apex of each tibia and each tarsus black, other parts yellowish; dorsum of the abdomen very dark brown, a middorsal stripe and an abbreviated lateral stripe on each side clear yellow.

Female: Length 12–15 mm., front of medium width, narrower than in *costalis*, yellow pollinose, callosity rather small and shining black.

Male: Length as in the other sex; head of nearly the same form and size as in the female, facets of the eye all small, nearly of the same size; abdomen gradually narrowed from the base. This sex was taken while hovering in the sun about the middle of the forenoon.

Habitat: Specimens were taken at Puerto Barrios, Morales, and Panzos, all in Guatemala, during the first half of March.

In appearance much like *appendiculatus*, but the head of the male, the dark middle and posterior femora and the simple branch of the third vein are distinctive. Much darker in coloration than *costalis*.

Tabanus trilineatus Latreille. Bellardi, in his *Diptera of Mexico*, included a species which he called *trilineatus* but Osten Sacken who saw his specimen says that it is a synonym of *lineola*. The specimens I have placed under *trilineatus* are mostly from British Guyana, but one or two are from San Carlos, Costa Rica. They are lighter in coloration than specimens of *appendiculatus*, in fact nearer to *costalis* in this particular. The front is of normal width, the thorax is decidedly yellowish, the wings are hyaline with a rather pale stigma, and the fork of the third vein bears an appendage; the middorsal abdominal stripe is quite wide and the lateral stripes reach the fourth or fifth segment. All these stripes are decidedly yellowish in coloration. The eye of the male has a distinct area of enlarged facets which is separated from the occiput above by a narrow band of small facets.

Tabanus trivittatus Fabricius. The species I have placed under this name appears to agree well with Wiedemann's description of what I suppose were the types that Fabricius described. The most characteristic points in regard to the species are the very narrow front and the very dilute brownish wings. Other-

wise it looks much like a small specimen of *lineola*. The first segment of the antenna is enlarged and clothed with black hairs above, the third segment is red with the annulate portion black, basal portion rather wide with a prominent angle above; all the femora and tarsi black, anterior tibia at base and the other tibiae in their entirety yellow; thorax dark; abdomen very dark brown, middorsal stripe entire, white and narrow, lateral stripes yellowish, reaching the third segment.

Specimens from San Carlos, Costa Rica, measure 13 mm. in length.

***Tabanus truquii* Bellardi.** General color dark, something like the darker specimens of *lineola*, female abdomen darker than that of the male. Eyes pilose, although this character in the female is not conspicuous; first segment of the antenna much enlarged, dark red with black hairs above, basal portion of the third segment dark red, a well developed angle above, annulate portion brown; thorax dark, sparsely clothed with gray pollen, wing hyaline with a narrow dark brown stigma, front leg except basal part of tibia, middle femur at base and tarsus, posterior femur at base and apex of tibia and entire tarsus, black, otherwise legs red.

Female: Length 16 mm., front with sides parallel, clothed with brownish-yellow pollen; abdomen dark with three white stripes, middle one entire, lateral ones reaching the third segment.

Male: Length 15 mm., head of normal size, convex; eyes decidedly pilose, facets all nearly of the same size; abdomen not so dark colored as in the other sex, middorsal stripe narrow, lateral stripes not plainly defined.

Specimens from Sanarate and Panzos, Guatemala, taken in February and March.

***Tabanus unistriatus* n. sp.** This species is a miniature of *modestus* in general appearance but the front is much narrower in proportion and there are no lateral stripes on the abdomen. Antenna red, first segment enlarged, third segment with an angle above and with its annulate portion black and not over half as long as the basal portion; front narrow, decidedly narrower below than above, callosity elongate, shining; thorax black, sparsely clothed with greenish-yellow pollen, wings uniform dilute brownish, legs with all the femora and tarsi and the apical half of the anterior tibiae black, other parts red; abdomen black above with a narrow middorsal white stripe reaching the end of the sixth segment.

Length of the female 7-9 mm. The male was not procured.

Habitat: Specimens from San Carlos, Costa Rica, are the property of the U. S. National Museum.